

# **Engineering Design File**

## **Reinforced Polypropylene Cover for PM-2A Tanks**

**Portage Project No.: 2073.00**  
**Project Title: PM-2A Remediation Phase I**



TEM-0104  
03/30/2004  
Rev. 0

1. Portage Project No.: 2073.00      2. Project/Task: PM-2A Remediation Phase 1
3. Subtask: Tank Excavation
4. Title: Reinforced Polyethylene Tank Cover

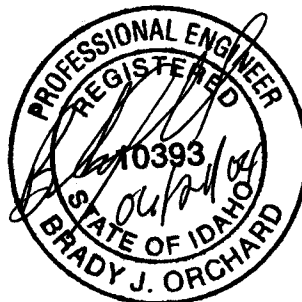
5. Summary:

This engineering design file summarizes the selection and design of a material to cover PM-2A tanks during transport from the tank excavation to the TAN-607A High Bay.

6. Distribution: (Portage Environmental, Inc.)  
Lisa Aldrich, PEI Document Control (Original)  
Brady J. Orchard, P.E.  
Clement B. Potelunas, P.E.  
Jeff A. Towers

7. Review (R) and Approval (A) Signatures:  
(Identify minimum reviews and approvals. Additional reviews/approvals may be added.)

	R/A	Printed Name/ Organization	Signature	Date
Author	A	Clement B. Potelunas, P.E.	<i>Clement B. Potelunas</i>	6/21/04
Independent Review	R	Jeff A. Towers	<i>Jeff A. Towers</i>	6-21-04
Project Manager	R/A	Brady J. Orchard, P.E.	<i>Brady J. Orchard</i>	6/21/04



CONTENTS

1. INTRODUCTION AND PURPOSE ..... 3

2. APPLICATION ..... 3

3. INSTALLATION ..... 3

Attachment 1 – 30-mil XR-5 Reinforced Polypropylene Sheeting Specifications ..... 4

Attachment 2 – FiberTite – SM Membrane Specifications..... 9

Attachment 3 – Americover DURA SKRIM 2FR and 10FR Specifications ..... 12

Attachment 4 – Drawing No. P-FFA/CO-PM2A-005 ..... 15

## **1. INTRODUCTION AND PURPOSE**

The purpose of this engineering design file is to summarize the design of a tank cover and selection of an appropriate material to cover the PM-2A tanks during transportation from the excavation to the TAN-607A High Bay. A durable, flexible, and liquid-tight material is desired such that any potential residual surface contamination that withstands initial exterior cleaning and becomes dislodged during transport is contained. The need for a tank cover is necessitated by the requirement to minimize or eliminate the spread of contamination.

## **2. APPLICATION**

The material selected is 30-mil reinforced polypropylene sheeting (see Attachment 1 for specifications). This material was selected because of its tensile and tear properties and its ability to withstand potential pull-through of grommets. A fire retardant membrane (FiberTite-SM membrane or DURA SKRIM 10FR, or equal; see specifications in Attachments 2 and 3), will be placed between the cradles and polypropylene sheeting, and the sheeting and the tank, to protect and cushion the sheeting when the tanks are set on the cradles of the transporter.

## **3. INSTALLATION**

Two sheets of Integra Plastics Product Code XR-5 (72 by 30 ft) with brass grommets installed on 5-ft-0-in. centers will be used to wrap the tanks for transport. One sheet is required for each tank. In order to minimize direct contact with the tank, a Genie Lift may be used to facilitate securing the sheeting to the tank. Other methods to secure the sheeting may be explored to maintain the radiation dose as low as reasonably achievable.

- Sections of 60-ft rope will be attached to the grommets on one side of the tarp. Rope loops will be attached to the grommets on the other side of the tarp.
- After the tank is set on the transporter (on the cradles), the ropes will be tossed over the tank, passed through the respective loop on the other side, and tossed back over the tank.
- The ropes will then be pulled tight to raise the cover to the upper portion of the tank and secured to the closest cradle support beam.

Other methods of attaching the sheeting may be used as determined by conditions in the field. Additional ropes, tape, elastic cords, or other materials may be used to secure the sheeting and to assist in contamination control. The tanks will be stored in the TAN-607A High Bay with the covers in place. See Drawing P-FFA/CO-PM2A-005 (Attachment 4) for installation configuration and layout.

## **Attachment I**

### **30-mil XR-5 Reinforced Polypropylene Sheeting Specifications**

# 8130 XR-5<sup>®</sup> REINFORCED SHEETING

Product Code: XR-5<sup>®</sup>

PROPERTIES	TEST METHOD	VALUE
<b>Profile thickness</b>	Caliper	30.0
(+/- 10%) (mil)	weight ASTM D-751	30.0
<b>Scrim Construction</b> (polyester or nylon)		
-warp/thread count		not specified
-weft/thread count		not specified
-warp/denier		not specified
-weft/denier		not specified
<b>Tensile Properties</b>	ASTM D-751 A	
-grab tensile warp (lbs)		475
-grab tensile weft (lbs)		425
<b>Tear Properties</b>	ASTM D-751 B	
-tongue tear warp (lbs)		125
-tongue tear weft (lbs)		125
<b>Strip Tensile</b> (minimum lbs)	ASTM D-751 B	
-warp		400
-weft		350
<b>Trapezoid Tear</b> (minimum lbs)	ASTM D-1117 (Section 14)	
-warp		35
-weft		35
<b>Hydrostatic Resistance</b>	ASTM D-751 A	500
(psi)	(procedure 1)	
<b>Puncture Resistance</b>	ASTM D-751	800
(lbs. 1" ball)		
<b>Low Temperature Flexibility</b>	ASTM D-2136	-30
(1/8 in. mandral @ °F)(4 hrs)		no cracking
<b>Dimensional Stability</b>	ASTM D-1204	2.0
(% change maximum)	1 hr @ 212°	
<b>Water Absorbtion</b>	ASTM D-471 Section 12	5%max@70°
(% wgt change, maximum)		12%max@212°
<b>Weathering Resistance</b>	ASTM D-471 Section 12	no stiffening or cracking

(8000 minimum)

The values listed above are typical properties and are intended to be used as guidelines only. No guarantee or warranty regarding performances of their product is made by Integra Plastics, Inc. as the manner of use, handling and conditions are beyond our control. Install in accordance with accepted industry standards.

050799-24

bp



Amoco Fabrics and Fibers Company  
280 The Bluffs  
Austell GA 30168  
Phone 800-445-7732

June 4, 2004

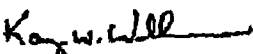
Asphalt Maintenance  
P O Box 50538  
Idaho Falls ID 83405

Roll # 3515655

Amoco Fabrics and Fibers Company hereby certifies that above mentioned roll of ProPex 4553 shipped to you meets the following minimum average roll values:

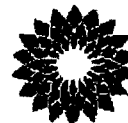
Property	Test Method	Minimum Average Roll Value (English)	Minimum Average Roll Value (Metric)
Grab Tensile	ASTM-D-4632	203 lb	900 Kn
Grab Elongation	ASTM-D-4632	50 %	50 %
Mullen Burst	ASTM-D-3786	380 psi	2610 kPa
Puncture	ASTM-D-4833	130 lb	575 kN
Trapezoidal Tear	ASTM-D-4533	80 lb	355 kN
UV Resistance	ASTM-D-4355	70 % at 500 hr	70 % at 500 hr
AOS	ASTM-D-4751	100 sieve	0.150 mm
Permittivity	ASTM-D-4491	1.5 sec <sup>-1</sup>	1.5 sec <sup>-1</sup>
Flow Rate	ASTM-D-4491	110 gal/min/ft <sup>2</sup>	4470 L/min/m <sup>2</sup>

Amoco Fabrics and Fibers Company manufactures all the nonwoven geotextile fabric certified above. The values are a result of testing conducted in on-site laboratories at the time of production. All test methods used are ASTM or industry standards. Test data is retained in the Quality Control files at Amoco's production facility.

  
Kay W. Williams  
Production Analyst/Quality Assurance Manager  
Amoco Fabrics and Fibers Company

ckb

bp



Amoco Fabrics and Fibers Company  
280 The Bluffs  
Austell GA 30168  
Phone 800-445-7732

JUNE 4, 2004

Asphalt Maintenance  
P O Box 60538  
Idaho Falls ID 83405

Re: Purchase Order #  
Shipping #

Piece	Weight									Permittivity
Number	Style	Yd. 2 Oz.	Thickness	Tensile	Elong	Wet	Puncture	Trac	Test	A.S.S. Sec.-1
2515655	4557	0.02	81	206	83	426	161	100	100	1.5

THIS DOCUMENT CONTAINS  
INFORMATION CLAIMED AS  
TRADE SECRET-CONFIDENTIAL  
BY AMOCO FABRICS & FIBERS COMPANY

## **Attachment 2**

### **FiberTite–SM Membrane Specifications**



**FiberTite® membrane features**  
an 18 x 19 / 840 x 1,000 denier weft reinforced  
polyester knit fabric coated with a  
proprietary ethylene interpolymer (EIP)  
compound, utilizing DuPont Elvaloy® KEE  
as the principle polymer.

FiberTite is a nominal 36 mil (0.9 mm) thick, manufactured in 56' x 100' (1.4 m x 30.5 m) conventional roll goods and 20' x 64' (6 m x 19.5 m) prefabricated rolls with integral 3.5 in. (8.9 cm) wide continuous fastening tabs. Prefabricated rolls greatly reduce field welding and subsequent labor factors.

FiberTite is also available in custom, prefabricated roll widths and lengths. Field seaming is accomplished by fusing the thermoplastic EIP membrane with conventional hot air welding equipment.

FiberTite excels in UV, tear, puncture and flame resistance. FiberTite Roofing Systems are also resistant to most forms of fungus, algae and/or micro-biological attack.

*Guide Specifications for mechanically  
attached, fully adhered and ballasted  
FiberTite Roofing Systems are available  
upon request.*

# FiberTite® Membrane

## PHYSICAL PROPERTIES:

Thickness (nominal)	ASTM D-751	0.036 in. ( 0.9 mm )
Breaking Strength	ASTM D-751 Grab	375 X 350 lbs ( 1.7 x 1.6 kN )
Tensile Strength	ASTM D-882	8500 psi ( 598 kgf/cm <sup>2</sup> )
Tear Strength	ASTM D-751	100 lbs ( 445 N )
Dynamic Puncture	ASTM D-5635	15 joules
Low Temperature Flex	ASTM D-2136	-30°F (-34°C)
Dimensional Stability	ASTM D-1204	< 1.0 %
Seam Strength	ASTM D-751	100% of fabric strength
Coating Adhesion	ASTM D-751	Cannot initiate coating peel
Hydrostatic Resistance	ASTM D-751	650 psi ( 46 kgf/cm <sup>2</sup> )
Oil Resistance	Mil-C-2069C	No swelling, cracking, leaking
Ozone Resistance	ASTM D-1149	No effect

**Fiberlite®**  
ROOFING SYSTEMS  
by Seaman Corporation

For more information on FiberTite Systems and Accessories please call:  
Seaman Corporation (800) 927-8578, International (330) 262-1111.

FiberTite® is a registered trademark of Seaman Corporation.

Elvaloy® is a registered trademark of DuPont.

[www.fibertite.com](http://www.fibertite.com)



**FiberTite®-SM membrane features  
an 18 x 19 / 840 x 1,000 denier weft reinforced  
polyester knit fabric coated with a  
proprietary ethylene interpolymer (EIP)  
compound, utilizing DuPont Elvaloy® KEE  
as the principle polymer.**

FiberTite-SM is a nominal 45 mil (1.1 mm) thick, manufactured in 56" x 100' (1.4 m x 30.5 m) conventional roll goods and 20' x 64' (6 m x 19.5 m) custom rolls with integral 3.5 in. (8.9 cm) wide continuous fastening tabs. Custom rolls greatly reduce field welding and subsequent labor factors.

FiberTite-SM is also available in additional customized roll widths and lengths. Field seaming is accomplished by fusing the thermoplastic EIP membrane with conventional hot air welding equipment.

FiberTite-SM excels in UV, tear, puncture and flame resistance. All FiberTite Roofing Systems are also resistant to most forms of fungus, algae and/or micro-biological attack.

*Guide Specifications for mechanically  
attached, fully adhered and ballasted  
FiberTite Roofing Systems are available  
upon request.*

# FiberTite® - SM Membrane

## PHYSICAL PROPERTIES:

Thickness (nominal)	ASTM D-751	0.045 in. (1.1 mm)
Breaking Strength	ASTM D-751 Grab	375 X 350 lbs (1.7 x 1.6 kN)
Tensile Strength	ASTM D-882	8500 psi ( 598 kgf/cm <sup>2</sup> )
Tear Strength	ASTM D-751	100 lbs (445 N)
Dynamic Puncture	ASTM D-5635	20 joules
Low Temperature Flex	ASTM D-2136	-30°F (-34°C)
Dimensional Stability	ASTM D-1204	< 1.0 %
Seam Strength	ASTM D-751	100% of fabric strength
Coating Adhesion	ASTM D-751	Cannot initiate coating peel
Hydrostatic Resistance	ASTM D-751	650 psi ( 46 kgf/cm <sup>2</sup> )
Oil Resistance	MIL 2069C	No swelling, cracking, leaking
Ozone Resistance	ASTM D-1149	No effect

**Fiberlite®**  
ROOFING SYSTEMS  
by Seaman Corporation

For more information on FiberTite Systems and Accessories please call:  
Seaman Corporation (800) 927-8578, International (330) 262-1111. [www.fibertite.com](http://www.fibertite.com)  
FiberTite® is a registered trademark of Seaman Corporation.  
Elvaloy® is a registered trademark of DuPont.

## **Attachment 3**

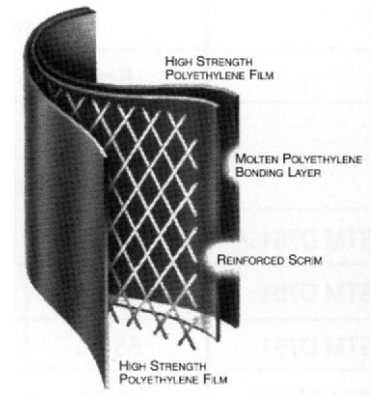
### **Americover DURA SKRIM 2FR and 10FR Specifications**



## **DURA SKRIM® 2FR & 10FR**

### **PRODUCT DESCRIPTION**

**DURA SKRIM 2FR and 10FR** consist of two sheets of high-strength fire-retardant film laminated together with a third layer of molten polyethylene. A heavy-duty scrim reinforcement placed between these plies greatly enhances tear resistance and increases service life. **DURA SKRIM's** fire-retardant films meet or exceed NFPA's 701 large and small scale requirements in addition to CPAI Section 6 and 7.

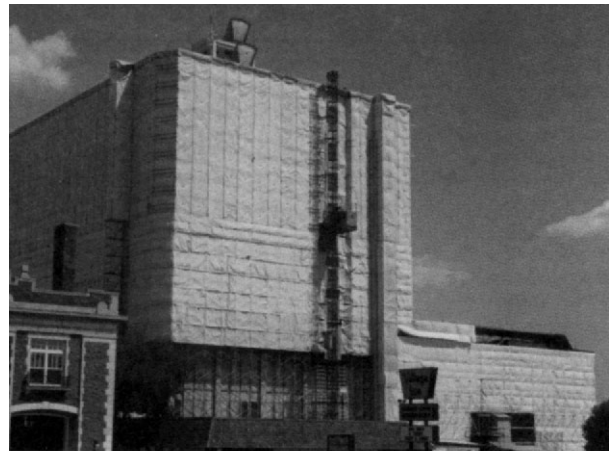


### **PRODUCT USE**

**DURA SKRIM 2FR and 10FR** are used in applications that require a fire-retardant material, and demand high puncture and tear strengths.

### **SIZE & PACKAGING**

**DURA SKRIM 2FR and 10FR** are available in a variety of widths and lengths. Panel sizes up to 40,000 square feet are available. All panels are accordion folded and tightly rolled on a heavy-duty core for ease of handling and time saving installation.



*Building Enclosure*

### **COMMON APPLICATIONS**

- Construction Enclosures
- Vapor Barriers
- Asbestos Abatement
- Fumigation Covers
- Insulation Membranes
- Temporary Walls
- Curtains
- Job Site Coverings

toll free (800) 747-6095 • local (760) 747-6095 • fax (760) 747-1920  
e-mail: [sales@americover.com](mailto:sales@americover.com) • website: [www.americover.com](http://www.americover.com)  
2067 Wineridge Pl. #F • Escondido, CA 92029

# DURA SKRIM® 2FR & 10FR

PROPERTIES	TEST METHOD	DURA•SKRIM 2FR		DURA•SKRIM 10FR	
		English	Metric	English	Metric
APPEARANCE		Translucent, Cream Color			
THICKNESS, NOMINAL		6 mil	0.152 mm	10 mil	0.25 mm
WEIGHT PER MSF		20 lbs	9.0 kg	43 lbs.	20 kg
CONSTRUCTION		Extrusion laminated with scrim reinforcement			
*1" TENSILE STRENGTH	ASTM D751	40 lbf.	178 N	50 lbf.	222 N
ELONGATION AT BREAK	ASTM D751	300%	400%	600%	600%
*GRAB TENSILE	ASTM D751	50 lbf.	222 N	78 lbf.	347 N
*TRAPEZOID TEAR	ASTM D4533	35 lbf.	156 N	52 lbf.	231 N
HYDROSTATIC RESISTANCE	ASTM D751	32 psi	220 kPa	74 psi	510 kPa
MULLEN BURST	ASTM D751	53 psi	365 kPa	169 psi	1165 kPa
MAXIMUM USE TEMPERATURE		180°F	82°C	180°F	82°C
MINIMUM USE TEMPERATURE		-70°F	-57°C	-70°F	-57°C
PERMEABILITY					
WVTR	ASTM E96 Method A	0.058 g/100in <sup>2</sup> /day	0.90 g/m <sup>2</sup> /day	0.013 g/100in <sup>2</sup> /day	0.20 g/m <sup>2</sup> /day
PERM RATING	ASTM E96 Method A	0.13 U.S. Perms	0.085 Metric Perms	0.030 U.S. Perms	0.020 Metric Perms
BURNING CHARACTERISTICS FLAME SPREAD INDEX SMOKE DEVELOPED VALUE	ASTM E84 Method A	0 20		5 75	

\*Tests are an average of diagonal directions.



#### MEETS OR EXCEEDS THE FOLLOWING FIRE TESTING:

1. National Fire Protection Association (NFPA) 701 Large and Small Scale
2. Canvas Products Association International (CPAI) Section 6 (Flooring Material)
3. Canvas Products Association International (CPAI) Section 7 (Wall and Top)
4. Class "A" Wall and Ceiling Finish Category as given in the National Fire Protection Association Life Safety Code 101, Section 6-5.3, "Interior Wall and Ceiling Finish Classification" (ASTM E-84-97a).

DURA SKRIM 2FR and 10FR are fire-retardant four-layer reinforced extrusion laminates. The outer layers consist of a high quality polyethylene film with a high concentration of fire-retardant additives. DURA SKRIM 2FR and 10FR are reinforced with a minimum of 900 denier scrim laid in a diagonal pattern spaced 3/8" apart with an additional machine direction scrim every 9" across the width. The individual piles are laminated together with molten polyethylene.

Note: To the best of our knowledge, these are typical property values and are intended as guides only, not as specification limits. AMERICOVER® MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage.

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toll free (800) 747-6095 • local (760) 747-6095 • fax (760) 747-1920

e-mail: [sales@americover.com](mailto:sales@americover.com)

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**Attachment 4**

**Drawing No. P-FFA/CO-PM2A-005**

